

35 U.S.C. § 103(a) REJECTIONS

The Examiner has rejected claims 1-3, 5-7, 9, and 10 under 35 USC 103(a) as being unpatentable over U.S. Patent Number 6,115,016 to Yoshihara, et al. ("Yoshihara" or the "Yoshihara Reference") in view of U.S. Patent Number 6,509,887 to Kondoh, et al. ("Kondoh" or the "Kondoh Reference"); claims 4 and 8 as being unpatentable over Yoshihara in view of Kondoh further in view of published Japanese Patent Application Number 04-058708 to Ito, et al. ("Ito" or the "Ito Reference"); and claims 11-13 as being unpatentable over Yoshihara in view of Kondoh further in view of U.S. Patent Number 6,317,181 to Hoshino ("Hoshino" or the "Hoshino Reference"). The Applicants respectfully traverse these rejections for the reasons provided in greater detail below.

Claims 1-3, 5-7, 9 and 10

The invention as claimed discloses an image display apparatus that provides uniform brightness by successively changing the light modulation state and reversing successive display frames so that picture elements ("pixels") have substantially the same light modulation state, see, e.g., Specification, page 30, lines 1-5, and by performing addressing scanning when the backlight is OFF. See, e.g., Id., page 34, lines 9-14. More specifically, the image display apparatus of the present invention includes a light emitting section that is switched ON and OFF once in each display frame, wherein the addressing scanning for the pixels is performed in each display frame while in the OFF state and the sequence of address scanning is reversed every one or more display frames.

This ensures that display information in successive display frames is not mixed, which prevents deterioration of image quality. See, e.g., Id., page 34, lines 4-14. Moreover, light transmittance of the pixels is substantially averaged. See, e.g., Id., page 33, lines 2-8.

The Yoshihara reference teaches a liquid crystal display ("LCD") device having a display control method that drives ON/OFF operation by time-division display switching. According to Yoshihara, each display period is divided into at least four sub-periods, emitting red light (R), blue light (B), green light (G) in the first three sub-period and all the R, B and G lights, i.e., white light (W) in the fourth sub-period. See, e.g., Yoshihara, col. 3, line 66 to col. 4, line 16. "The additional emission in the fourth sub-period improves the entire intensity." Id., col. 4, lines 26-27. Indeed, Yoshihara provides a 50 percent increase in white light intensity, see, e.g., Id., col. 6, lines 66 to col. 7, line 4, and more significant intensity increases for R, B, and G light. See, e.g., Id., Table I.

There is nothing in Yoshihara, however, that teaches, mentions or suggests successively changing light modulation states, i.e., ON and OFF, of pixels in each time frame or reversing the sequence of the address scanning every on or more display frame. The Applicants respectfully maintain that Yoshihara merely teaches successively changing the color of the light as part of a four sub-period time frame. Modulation states are shown illustratively as the hatched areas, for example, in FIGs. 1C and 1D. These figures, respectively, show that the light modulation of pixels P1x and Pnx in the first and second frames. By successively changing light modulation states of pixels in each time frame,

light modulation states of the picture elements on the scanning lines are substantially averaged [and] the brightness of the picture element P1x and the picture element Pnx in the light modulation states at the time of the switching ON of the backlight is substantially averaged . . .

Specification, page 33, lines 2-7 (Emphasis added).

The passages cited by the Examiner do not address this feature. Indeed, lines 26-44 of column 2 merely relate to the composition of the LCD element. There is no mention of address scanning or the display timing thereof. There is, further, no mention of changing light modulation states between successive frames.

Lines 33-67 of column 8 are directed to the details for displaying various colors during a display frame. However, changing the modulation state between successive display frames and address scanning when the light emitting section is OFF are not disclosed.

Furthermore, there is nothing in Yoshihara that teaches, mentions or suggests that pixel addressing scanning is performed in the OFF state of the light emitting section. Yoshihara describes time division of the different color back lighting but makes no mention of the modulation state of the liquid crystal between successive display frames or the of address scanning in an OFF mode. See, e.g. Yoshihara, col. 4, lines 1-28. Switching of Liquid crystal elements is described in column 7, lines 44-67; however, there is no suggestion that such switching occurs while the light emitting section is OFF. FIG. 2 merely shows an LED array. There is nothing in the figure to suggest that the array is OFF during address scanning. Furthermore, address scanning is not depicted in the tie charts of FIGs. 3 and 4. Finally, FIG. 5 merely illustrates LCD components. There is nothing in FIG. 5 to suggest that address scanning is performed while the light emitting section is OFF. Indeed, the Yoshihara reference is completely silent about addressing scanning altogether.

Finally, as the Examiner agrees, there is nothing in Yoshihara, however, that teaches, mentions or suggests that the sequence of the addressing scan is reversed.

Nor can the Kondoh reference make up for the deficiencies of the Yoshihara reference. Kondoh teaches resetting the modulation states of all pixels during the first period of each display. Moreover, it does not teach, mention or suggest successively changing the light modulation state and reversing successive display frames so that picture elements ("pixels") have substantially the same light modulation state or addressing scanning when the backlight is OFF or switching the light emitting section ON and OFF once in each display frame.

In short, it is respectfully submitted that, claims 1-3, 5-7, 9, and 10 are not made obvious by any of the cited references, and further, satisfy all of the requirements of 35 U.S.C. 100, et seq., especially § 103(a). Accordingly, claims 1-3, 5-7, 9, and 10 are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

Claims 4 and 8

For the reasons provided above showing that Yoshihara in view of Kondoh does not teach, mention or suggest claim 1 of the present invention, the same references, therefore, cannot make obvious claims depending therefrom. Moreover, the Ito reference, and, more specifically, Ito FIG. 2, cannot make up for the deficiencies of the Yoshihara and Kondoh references. Indeed, Ito does not teach, mention or suggest successively changing the light modulation state and reversing successive display frames so that picture elements ("pixels") have substantially the same light modulation state or addressing scanning when the backlight is OFF or switching the light emitting section ON and OFF once in each display frame.

In short, it is respectfully submitted that, claims 4 and 8 are not made obvious by any of the cited references, and further, satisfy all of the requirements of 35 U.S.C. 100, et seq., especially § 103(a). Accordingly, claims 4 and 8 are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

Claims 11-13

For the reasons provided above showing that Yoshihara in view of Kondoh does not teach, mention or suggest claim 1 of the present invention, the same references, therefore, cannot make obvious claims depending therefrom. Furthermore, the Hoshino reference cannot make up for the deficiencies of the Yoshihara and Kondoh

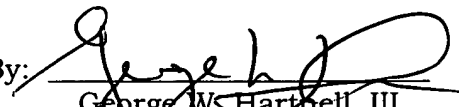
references because Hoshino does not teach, mention or suggest successively changing the light modulation state and reversing successive display frames so that picture elements ("pixels") have substantially the same light modulation state or addressing scanning when the backlight is OFF or switching the light emitting section ON and OFF once in each display frame.

In short, it is respectfully submitted that, claims 11-13 are not made obvious by any of the cited references, and further, satisfy all of the requirements of 35 U.S.C. 100, et seq., especially § 103(a). Accordingly, claims 11-13 are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

The Applicants believe that no additional fee is required for consideration of the within Response. However, if for any reason the fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,

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ANNEX TO RESPONSE TO OFFICE ACTION
PROVIDING MARKED-UP VERIOSN OF THE SPECIFICATION

IN THE SPECIFICATION

Please replace the paragraph between lines 4 and 8 on page 22 with the following:

Japanese Laid -Open Publication No. 11-84343 discloses a light scanning type spatial light modulator (SLM) in which address scanning is performed using light, and the scanning direction isare reversed every one or a plurality of frames.